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SUMMARY REPORT

A STUDY FOR THE
OLD WEST REGIONAL COMMISSION

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SUMMARY REPORT

**A STUDY FOR THE
OLD WEST REGIONAL COMMISSION**

BY
MOUNTAIN WEST RESEARCH, INC.
DECEMBER 1975

The Old West Region Commission is a Federal-State partnership designed to solve regional economic problems and stimulate orderly economic growth in the states of Montana, Nebraska, North Dakota, South Dakota and Wyoming. Established in 1972 under the Public Works and Economic Development Act of 1965, it is one of seven identical Commissions throughout the country engaged in formulating and carrying out coordinated action plans for regional economic development.

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COMMISSION OFFICES

1730 K Street, N.W.
Suite 426
Washington, D.C. 20006
202/967-3491

201 Main Street
Suite D
Rapid City, South Dakota 57701
605/348-6310

Room 306A
Fratt Building
Billings, Montana 59101
406/245-6711 Ext. 6665

STUDY COORDINATOR FOR THE OLD WEST REGIONAL COMMISSION:

Jeannette Studer

STUDY DIRECTORS:

Jim Chalmers
Judy Glazner

HOUSEHOLD SURVEY:

Judy Glazner, Director
Bill Douglass
Oro Lynn Harshman
Donna Aadsen
Delores Zieman

PROJECTS SURVEY:

Cal Cumin, Director

COMMUNITY SURVEY:

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EXPERIMENTAL DESIGN, ANALYSIS:

Bob St. Louis, Director
Jan Barringer
Reyn Du Bois
Harvey Krauss

THE CONSTRUCTION WORKER PROFILE STUDY

The CONSTRUCTION WORKER PROFILE was conducted for the Old West Regional Commission to study the socio-economic consequences of the construction of large energy-related facilities. The emphasis of the study was on the collection of primary data, and three distinct efforts were required.

- A **Household Survey** was conducted which consisted of door-to-door interviews with 1432 households in nine western communities which have been affected, are being affected, or will be affected by large energy-related construction projects. The purpose of the household survey was to determine household and labor force characteristics, commuting patterns, residential preferences, social integration, household expenditures, satisfaction with community services, and attitudes of residents about both the projects and their community. Respondents to the household survey included residents who lived in the community prior to the construction project(s) and, in the case of currently affected communities, newcomer construction workers and other newcomers. For the post-impact communities, a sample of all residents was interviewed.
- A **Project Survey** was undertaken which consisted of distributing and collecting short self-administered questionnaires to construction workers at 14 major construction sites in eight western states. A total of 3168 responses was obtained which indicated workers' characteristics with respect to household composition, place of residence, previous residence, and occupation.
- A **Community Survey**, during which three social scientists lived for a time in three of the Household Survey communities, and conducted structured, in-depth interviews with households and less structured interviews with institutional representatives, was the third activity of the study. The purpose of this procedure was to determine some of the construction period impacts on the personal lives of community residents and on the communities' institutions, and also to observe both individual and institutional response to those impacts.

The results of the study are summarized in 10 documents.

I. **CONSTRUCTION WORKER PROFILE: FINAL REPORT**
Purpose: To provide a detailed account of the purpose, method, and results of the study. Emphasis is placed on generalizations supported by the data with special attention to the applicability of the results to the planning and impact assessment processes.

II. **CONSTRUCTION WORKER PROFILE: SUMMARY REPORT**
Purpose: To make the objectives and principal findings of the study easily accessible to the nontechnical reader.

III. **CONSTRUCTION WORKER PROFILE: COMMUNITY REPORTS**
A. Green River and Rock Springs, Wyoming
B. Forsyth and Colstrip, Montana
C. Center, North Dakota
D. Langdon, North Dakota
E. Conrad, Montana
F. Killdeer, North Dakota
G. St. George, Utah

Purpose: To prepare seven distinct community reports containing descriptions of the Household Survey findings for individual communities and summaries of information from the Project Survey on projects relevant to each. Due to the proximity of Rock Springs to Green River and of Forsyth to Colstrip, the community reports for each of these pairs of communities were combined in single volumes under the assumption that anyone interested in one would be interested in the other.

IV. **CONSTRUCTION WORKER PROFILE: USER'S GUIDE TO THE DATA**
Purpose: To document the methodology, procedures, and results of the study so that the basic data can be used by other researchers. The entire data set is described in detail as are the procedures for obtaining the data on tape, punched cards, or hard copy.

Distribution of Publications:
The documents described above are available on request from:
Old West Regional Commission, 1730 "K" Street, N.W., Suite 426, Washington, D.C. 20006

Distribution of Data:
The procedures for the distribution of data are described in the USER'S GUIDE TO THE DATA. Questions about these procedures may be directed to:
Ms. Jeannette Studer, Old West Regional Commission, Fratt Building, Suite 306A,
Billings, Montana 59101, (406) 245-6711, Ext. 6665, OR

Ms. Jan Barringer, Mountain West Research, Inc., 123 E. University Drive, Suite 219,
Tempe, Arizona 85281, (602) 968-7991.

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INTRODUCTION

Many areas of the Rocky Mountain States are now or soon will be the sites of major construction projects associated with the production of energy. Extraction and conversion of the natural resources necessary to produce this energy portends dramatic changes for many areas that have historically been rural and sparsely settled. The construction forces required for mining, transportation, and energy conversion facilities have already altered the size of formerly small communities, placed severe strains on public facilities and housing in these communities, and have affected the life style of the residents. Five years ago there was no extensive empirical record on which to base an evaluation of the social and economic consequences of large-scale construction activity. That is no longer the case. There now exists a substantial body of experience with, and information about, the effects of large numbers of construction workers on the communities of which they have become a part and on the individuals with whom they have come into contact. A necessary first step to help concerned individuals and community representatives anticipate and plan for construction worker impacts is to carefully describe some of these experiences and to analyze them for regularities and discernable cause and effect relationships. The purpose of the CONSTRUCTION WORKER PROFILE was to take this first step.

Consistent with this general statement of purpose, the study had two specific objectives. The first was to develop a broad based set of primary data on construction projects and related work forces that describe the experiences of communities in the region and that document the sources of the impacts they have felt. The intention was that the information would not only serve the purposes of this report but would also provide other researchers with a readily available data source, thus avoiding duplicative survey research in the region's communities.

The second objective was to analyze the data to determine both the stability and the quantitative magnitude of certain important relationships which are factors in determining the impact of a construction force on nearby communities. It was felt to be equally important, however, that the applicability and limitations of this analysis be made explicit so that its misuse might be avoided. In the report that follows, a descriptive account is given of several of the most important findings of the study followed by a summary of some of the analytic results. The report concludes with a brief discussion of the applicability of the results to the planning and impact assessment processes. The CONSTRUCTION WORKER PROFILE: FINAL REPORT addresses all of these topics in substantially more detail.

RESULTS OF THE STUDY

During the summer of 1975 two types of questionnaires were administered in the Rocky Mountain Region by the study team. Interviews, lasting approximately one-half-hour, were administered by field researchers to over 1400 households in nine sample communities, and, at the same time, a short, self-administered questionnaire was distributed to over 6000 workers on fourteen major construction projects. These two efforts are referred to as the Household and Project Survey, respectively. The Household Survey, conducted in the nine sample communities, inquired in depth about those characteristics and attitudes of the construction workers living in the communities thought to be important determinants of their socio-economic impact; it also investigated the effects of construction activity on long time residents of the affected communities. The Project Survey, conducted at the project sites, was addressed to three questions of fundamental importance: from where do the construction workers come, where do new workers choose to live, and how many dependents can be expected to accompany the new workers. Some of the important results of the Project Survey are presented first followed by a discussion of the findings of the Household Survey.

The Project Survey

The Project Survey was faced with two difficult problems from the beginning. First, and most serious, there are only a limited number of observations on the relationships of greatest interest. In other words, a single project, even though it may employ several hundred or even thousands of persons, yields only one observation on the local/non-local mix of the construction work force. The project may employ 30 percent local workers and 70 percent non-local workers, but in order to study the determinants of this ratio, many projects must be studied for there to be enough information for statistical analysis. The second problem concerns the difficulty of obtaining the necessary information from individual workers. Contractors are understandably reluctant to allow information to be obtained on company time, and a mail questionnaire is always subject to non response problems.

In light of these difficulties, it was decided that an attempt must be made to survey as many as possible of the major projects (greater than 100 employees) under way during the summer of 1975 in the nine state Mountain Region in order to have a usable number of observations.[1] A total of fourteen projects was identified and their locations are shown in Figure 1. A questionnaire (short enough to be printed on an IBM card) was distributed to all project workers and collected by either company or union personnel. Even though it meant soliciting information from many thousands of workers, this approach proved feasible, and a good response was obtained because of the brevity of the questionnaire and the combined cooperation of management and labor personnel. Accordingly, the questionnaire was distributed to 6310 workers, and 3168 usable responses were obtained, reflecting an aggregate response rate of approximately 50 percent. Analysis of these responses yielded much information of interest, the highlights of which are discussed below.

Local/Non-Local Composition of the Work Force

Workers were classified as non-local if their present address was not in the same town as it was before they started work on the construction project. They were classified as local if their present address was in the same town as it was before they started work on the project. This means that a worker on the Jim Bridger site who commutes from Green River and who has always lived in Green River was considered a local worker. A worker presently working at Jim Bridger and living in Rock Springs would be a non-local if prior to this job he had lived in another community (even if it was Green River). The essence of the distinction, therefore, is whether the new job necessitated or induced a change of residence. Table 1 shows that of the 3168 construction workers from whom responses were received, 1264, or 39.9 percent, were local workers. Although two projects had extreme values — San Juan was 78.6 percent local while Wyodak was only 3.2 percent local — many of the projects fell close to the average value of 40 percent local.

Origin of Non-Local Workers

Another critical question is that of the origin of the non-local workers. If non-local workers represent intrastate or intraregional redistributions of surplus labor, the implications are very

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[1] The nine state region comprises the five states of the Old West Region (North and South Dakota, Montana, Nebraska, and Wyoming) and the four states of the Four Corners Region (Arizona, Colorado, New Mexico, and Utah).

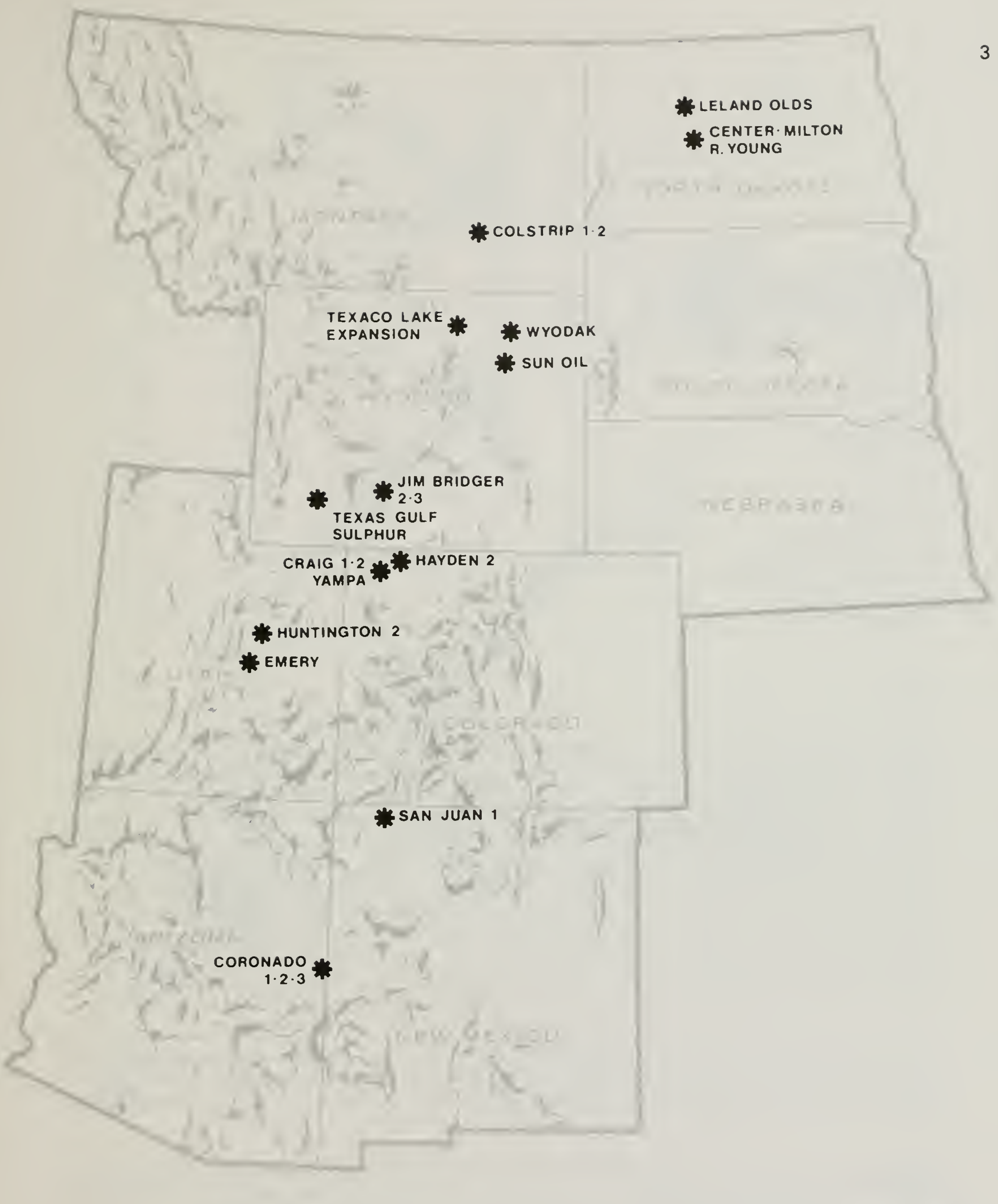

FIGURE 1

Project Survey Sites

TABLE 1

LOCAL WORKERS AS A PERCENTAGE OF TOTAL WORKERS

Project Number and Name	**Total Construction Workers Responding**	**Local Construction Workers**	**Percentage Local**
1 Coronado 1, 2, 3	119	48	40.3
2 Craig 1, 2 — Yampa Power Plant	307	129	42.0
3 Hayden 2	483	155	32.1
4 Colstrip 1, 2	161	62	38.5
5 Center — Milton R. Young	73	35	47.9
6 Leland Olds	193	86	44.6
7 San Juan 1	234	184	78.6
8 Emery	130	69	53.1
9 Huntington 2	307	142	46.3
10 Jim Bridger 2, 3	503	149	29.6
11 Texaco Lake Expansion	206	86	41.7
12 Sun Oil — Cordero Mine	133	57	42.9
13 Texas Gulf Sulphur	227	59	26.0
14 Wyodak	92	3	3.2
TOTAL	**3168**	**1264**	**39.9**

different from a situation in which the workers are migrants into the region. Of the total 1693 non-local workers who gave usable previous address information, 46 percent were from the same state in which the project on which they were working was located, 20 percent were from other states in the nine state region, and 34 percent originated from outside the nine state region. Figure 2 expresses the same information, but the flows are expressed as a percentage of total workers rather than as a percentage of non-local workers and the percentages are calculated separately for the Old West Region and the Four Corners Region. For projects in the Old West Region, 33.8 percent of all workers surveyed were local, and an additional 24.3 percent were from the Old West Region, although they had moved within the Region in order to assume their present jobs. Thus, on the basis of the surveys of eight projects in the Old West Region, about 58 percent of the jobs had been domestically filled. Of the remaining 42 percent, approximately one quarter were filled by workers from the Four Corners Region and three quarters by workers from outside the nine state region.

The situation in the Four Corners Region was somewhat different. As might be expected due to its larger population,[2] the Four Corners area had only to import approximately 12 percent of its construction workers. About 46 percent were local workers and about 41.6 percent were non-local workers who had moved from some other location within the Region.

Given the surprisingly high proportion of workers originating from within the Region and the high wages that they received, the inference can be drawn that a major effect of these construction

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[2] Populations of the two regions in 1970 were 3,793,586 for the Old West Region and 6,053,430 for the Four Corners Region (U.S. Bureau of the Census, *1970 Census of Population: Characteristics of the Population, United States Summary* (Washington, D.C.: U.S. Government Printing Office, 1973), p. 1-48).

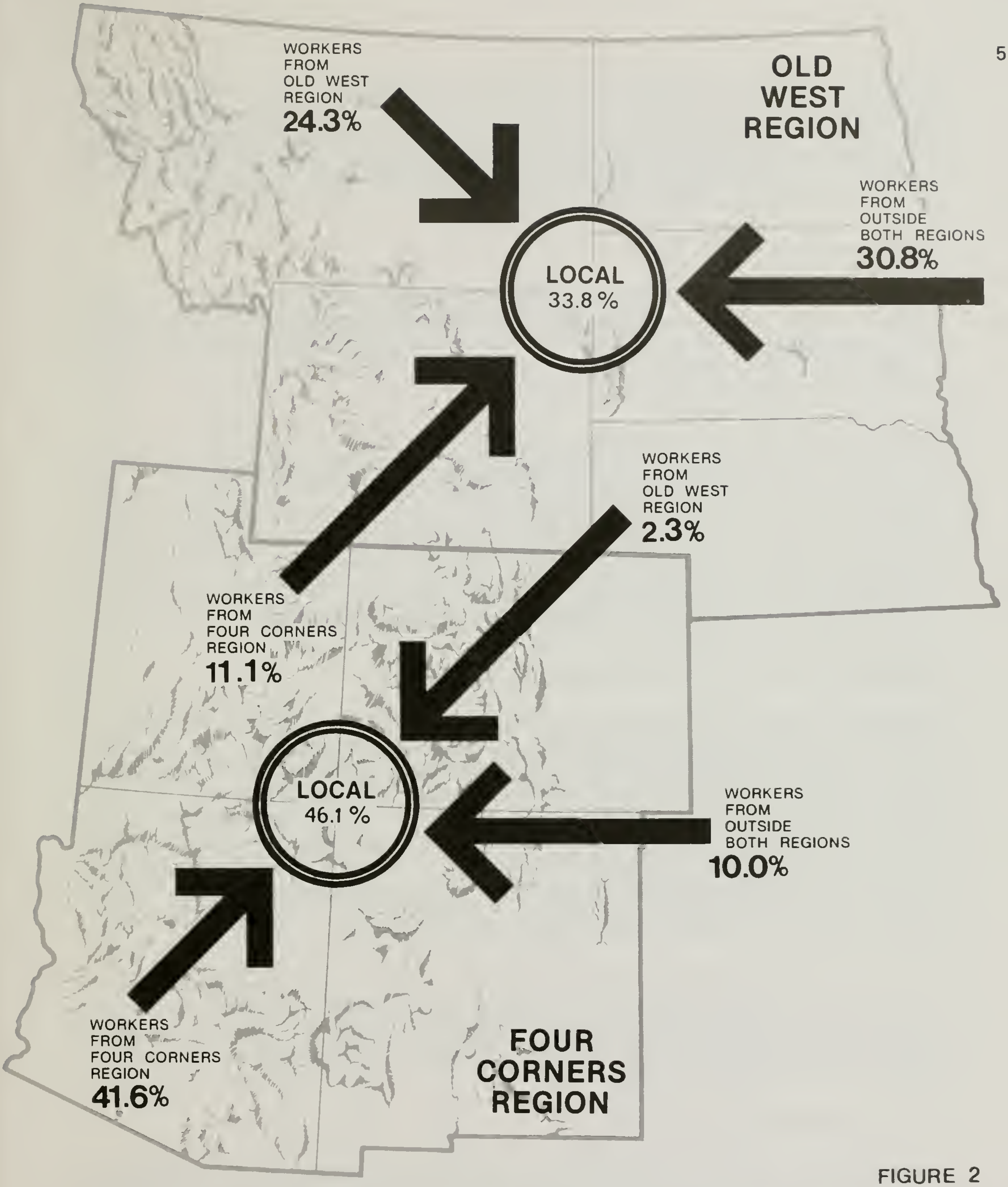

FIGURE 2

Construction Workers by Region of Previous Address

projects has been to raise regional per capita income. Evidence on this is provided by the Household Survey and is discussed below. The concern that the bulk of the income and jobs created by the construction projects would accrue to workers in-migrating from outside the region was not supported by the data. It also follows that the majority of the construction workers was more similar in terms of socio-cultural background to the residents of communities into which they had moved than had originally been anticipated.

Marital Status and Family Size

Another unexpected result of the Project Survey analysis was the finding that local and non-local workers had similar family sizes. For local workers the mean family size was 3.97 persons while for non-local workers the mean was 3.78 persons. The local workers had somewhat larger families than did the non-local workers, although both groups had family sizes larger than the 1970 average for the United States (3.57 persons per family[3]).

The important difference in family characteristics between the two sets of workers is that many of the married non-local workers did not have their families with them, although the proportion was not as great as assumed previously. The project having the lowest proportion of married non-local workers with families present was the Emery project in Utah (46.2 percent of married non-locals), while the proportion of married non-local workers with family present was greatest at the Jim Bridger plant outside Rock Springs, Wyoming (77.6 percent). The average for all fourteen projects was 63.1 percent, and most projects were close to the mean. The overall number of dependents accompanying the non-local workers was further diminished by the fact that the percentage of non-local workers with family present decreased as size of family increased.

Population Influx Per 100 Non-Local Construction Workers

The effects of marital status, family size, and presence or absence of the family are combined in Table 2 to show the total population influx associated with 100 non-local construction workers for each of the projects surveyed. The data from each of the projects have been normalized to a common basis of a one hundred worker increment for ease of comparison. The results are striking in that they show a substantially larger influx of persons than has been supposed. Slightly more than half of the workers were alone (51 percent), and these were fairly evenly divided between single workers and married workers whose families were not present. The half of the workers (49 percent) with their families present averaged 1.6 children per family. The total influx of persons associated with 100 non-local workers, therefore, would include the 100 workers plus 48.9 spouses and 78.9 children for a total direct population increase of 227.8 persons.

It is important to note that, while 2.278 persons were the average population increase per non-local worker, there was substantial variation among projects from a low of 1.452 for the Sun Oil, Cordero Mine to a high of 2.877 for the Jim Bridger plant. All of the other projects showed population influxes very close to, or above, 2.0 persons per non-local worker with ten of the projects in the range from 1.97 to 2.30 persons.

The Household Survey

The Household Survey was designed to determine the characteristics of the populations of communities which were being affected by large construction projects at the time of the study,

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[3] U.S. Bureau of the Census, *1970 Census of Population: Characteristics of the Population, United States Summary* (Washington, D.C.: U.S. Government Printing Office, 1973), p. 1-1628.

TABLE 2

AVERAGE POPULATION INFLUX PER 100 NON-LOCAL CONSTRUCTION WORKERS

Project Number and Name	Worker Single, Widowed, or Divorced	Worker Married, Family Absent	Worker Married, Family Present			Total Population Influx per 100 Non-Local Construction Workers
			Worker	Spouse	Children	
1 Coronado 1, 2, 3	8.7	30.4	60.9	60.9	69.6	230.5
2 Craig 1, 2 — Yampa Power Plant	27.2	30.8	42.0	42.0	57.4	199.4
3 Hayden 2	22.8	31.1	46.2	46.2	64.4	210.7
4 Colstrip 1, 2	34.0	24.7	41.2	41.2	94.8	235.9
5 Center — Milton R. Young	25.0	36.1	38.9	38.9	69.4	208.3
6 Leland Olds	17.1	37.1	45.7	45.7	78.1	223.7
7 San Juan 1	21.7	21.7	56.5	56.5	73.9	230.3
8 Emery	13.3	46.7	40.0	40.0	73.3	213.3
9 Huntington 2	10.6	34.8	54.7	54.7	93.8	248.6
10 Jim Bridger 2, 3	21.3	14.0	64.7	64.7	123.0	287.7
11 Texaco Lake Expansion	34.2	24.6	41.2	41.2	56.1	197.3
12 Sun Oil — Cordero Mine	65.3	17.3	17.3	17.3	28.0	145.2
13 Texas Gulf Sulphur	32.9	25.7	41.3	41.3	67.7	208.9
14 Wyodak	21.6	18.2	60.2	60.2	67.0	227.2
TOTAL ALL PROJECTS	24.6	26.5	48.9	48.9	78.9	227.8

communities which had been affected by such projects in the recent past, and communities which will be affected by such projects in the near future. In examining the populations of the five currently affected study communities, attention was focused on three groups: those newcomers to the communities who were working on major construction projects (newcomer construction workers); those newcomers attracted to the community as a result of the increased economic activity, but who were not working on construction projects (other newcomers); and the community residents who had lived there prior to the introduction of the construction project(s) (long time residents). The distinction between newcomers and long time residents was based on length of residence relative to the elapsed time since construction activity was begun in the area. In Rock Springs and Green River, for example, household members were classified as long time residents if they had been community residents prior to June, 1971. Newcomer construction workers identified in the Household Survey correspond to the non-local construction workers identified in the Project Survey, although the separate terms are maintained to minimize confusion in the use of the two data sources.

The two groups of newcomers, construction workers and others, were studied because they included the people who constituted the source of socio-economic impacts felt by the communities into which they moved. The characteristics of these groups were felt to be important in helping determine both the nature and the extent of those impacts. Characteristics of the long time residents of these communities were investigated in order to estimate how they had been affected by rapid population growth, by the presence of many newcomers, and by the concomitant increase in economic and social activity. Characteristics of the residents of two pre-impact and two post-impact communities were investigated primarily for comparative purposes. It was felt that comparisons among residents of those communities and long time residents of the currently affected communities could make more clear how the original residents of the post-impact and currently affected communities were being or had been affected by rapid population growth.

The first part of this section is a brief discussion of the methodology used in the Household Survey. The next part focuses on characteristics of newcomer construction workers in the five currently affected communities. Characteristics of other newcomers and long time residents will be compared and contrasted with those of the construction workers where appropriate. The third part of the section deals with the effects of the construction project(s) and the associated population growth on the long time residents of the currently affected communities. Finally, the attitudes of the newcomers with respect to the communities into which they had moved will be discussed.

Sampling and Field Procedures

In the currently affected communities, there were three groups of interest: newcomer construction workers, other newcomers, and long time residents. To insure adequate sample sizes and representativeness within each of these groups, a two-stage sampling procedure was devised for the currently affected communities. For the first phase of the sampling procedure preliminary estimates of the populations of the three groups within the community were made, sample quotas for each group were established, the community was divided into contiguous clusters of households, and an interview was conducted with a randomly selected household in each cluster. By proceeding through the entire community once using systematic sampling techniques, the proportions of the total population formed by the three subgroups were determined. For the second phase, the results of the first phase were used to revise the estimates of the population of each group of interest and to determine minimum sample sizes for each group. The community was then divided into a different number of clusters (a number great enough to insure that all sample quotas would be filled by interviewing one household in each cluster) and one household was interviewed in each cluster. As quotas were filled, the interviewers began to screen the selected households for length of residence and occupation in order to determine whether the interview should be completed.

More detailed information on sample size determination, data handling and analysis procedures, and the survey instruments can be found in CONSTRUCTION WORKER PROFILE: USER'S GUIDE TO THE DATA.

Using these procedures, 1432 usable interviews were obtained in the nine study communities: 1095 in the currently affected communities (a 9 percent sample of households); 179 in the post-impact communities (an 8 percent sample); and 158 in the pre-impact communities (a 5.1 percent sample). The currently affected communities were: Rock Springs and Green River, Wyoming; Forsyth and Colstrip, Montana; and Center, North Dakota. The post-impact communities were Langdon, North Dakota and Conrad, Montana. No communities could be identified in the region that had been previously affected by large-scale construction projects except these two which were ABM sites. The difference that the particular nature of these projects may have made on the experience of the two communities is discussed in the Conrad and Langdon COMMUNITY REPORTS. The pre-impact communities were Killdeer, North Dakota, and St. George, Utah. The locations of these communities are shown in Figure 3.

Demographic Profile of Construction Workers

The following discussion focuses on the characteristics of newcomer construction workers observed to be fairly constant for all of the currently affected communities studied. Comparisons among newcomer construction workers, other newcomers, and long time residents are made when appropriate or revealing.

Age

Newcomer construction worker households and other newcomer households were quite similar in terms of age characteristics. Median ages for the two groups were very close and were younger than the median for long time resident households. In addition, all three groups in the currently affected communities were much younger than the populations of the states in which they were located and of the United States. Table 3 compares median ages for these populations.

TABLE 3

MEDIAN AGE COMPARISON — CURRENTLY AFFECTED COMMUNITIES

Population Group	Median Age
Currently Affected Communities:	
Newcomer Construction Workers	22.46
Other Newcomers	21.92
Long Time Residents	23.69
Montana	27.10[a]
North Dakota	26.40[a]
Wyoming	27.20[a]
United States	28.10[a]

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[a] Source: U.S. Bureau of the Census, *1970 Census of Population: Characteristics of the Population, United States Summary* (Washington, D.C.: U.S. Government Printing Office, 1973), p. 1-310.

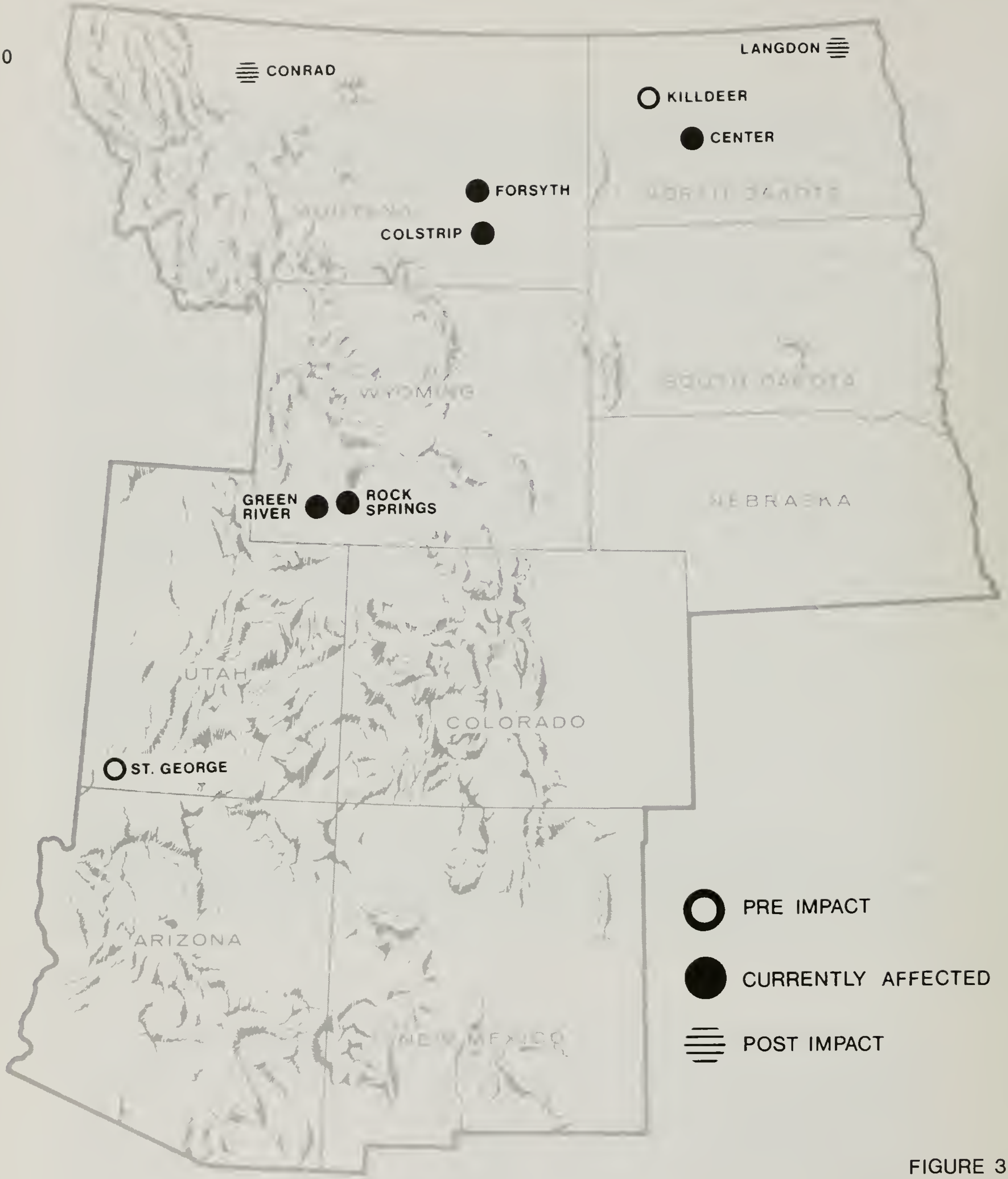

FIGURE 3

Household Survey Communities

In terms of age distribution of household heads, the two newcomer groups were quite similar, while long time residents were more similar to the U.S. population as a whole. For instance, among newcomer construction workers, 64.6 percent of the household heads were under 35, while for other newcomers, the proportion was 72.2 percent. For long time residents, the proportion under 35 was 30.7 percent, very close to the U.S. proportion of 28.9 percent. The effect of the newcomers, therefore, has been to lower the median age of the communities into which they have moved.

Education

Newcomer construction workers exhibited a distinct pattern of educational attainments. This was the group which most frequently indicated high school graduation as the highest educational level attained, and it was the group exhibiting the highest frequency of vocational-technical training and the lowest frequency of graduation from college. In most respects, however, this group resembled the long time residents most closely with respect to educational attainments. The other newcomer group had by far the greatest amount of formal education. All three groups had higher educational attainments than do the populations of the states in which the currently affected communities are located and of the United States. Table 4 compares educational attainments of the four population groups.

The higher educational attainments of other newcomers in the currently affected communities are significant in that, if the other newcomers become permanent residents, the communities will have gained a pool of highly educated people. These people with professional and managerial skills are an essential determinant of a community's ability to cope with problems which occur, its ability to plan for the future, even its ability to provide basic services. This supposition is supported by educational data collected in the post-impact communities.

Income

The income level of the newcomer construction workers was their most striking characteristic. Table 5 contrasts the median annual household incomes of the three groups in the currently affected communities and of the population of the United States. Median income for newcomer construction workers was 27 percent higher than for long time residents and on the order of 40 percent higher than the national median based on the estimate in the footnote to Table 5.

As further illustration of the income differences among the groups, only 3.6 percent of the newcomer construction worker households had annual incomes of less than $10,000, while 15.2 percent of other newcomer households fell in this category as did 25.8 percent of the long time resident households. Nineteen percent of the newcomer construction worker households had annual incomes of $25,000 or more as compared to only 8.6 percent of other newcomers and 9.6 percent of long time residents.

Labor Force Participation of Spouses

An interesting difference existed among newcomer construction workers, other newcomer, and long time resident households with respect to labor force participation of spouses of the household heads. In newcomer construction worker households, 12 percent of the spouses had jobs outside the home; in other newcomer households, 25.3 percent of the spouses had jobs; and in long time resident households, 32.8 percent of the spouses had jobs. This phenomenon (low labor force participation by newcomer construction worker spouses) was observed with such

TABLE 4

EDUCATIONAL ATTAINMENT — CURRENTLY AFFECTED COMMUNITIES, MONTANA, NORTH DAKOTA, WYOMING, AND THE UNITED STATES

	Percentage of Residents						
	Currently Affected Communities[a]						
Highest Educational Level Completed	**Long Time Residents**	**Newcomer Construction Workers**	**Other Newcomers**	**Montana**[c]	**North Dakota**[c]	**Wyoming**[c]	**United States**[c]
Less than high school graduation	27.1	16.6	11.8	40.8	49.7	37.1	47.7
High school graduate	43.8	45.5	32.4	34.0	27.6	36.2	31.1
Some college	13.7	21.6	28.8	14.1	14.3	14.8	10.6
College graduate	8.3	6.4	16.3	6.9	5.2	7.2	6.1
Some graduate school	2.0	1.3	4.0				
Advanced degree	2.2	.9	3.6	4.1	3.2	4.6	4.6
Vo-tech school	2.9	7.7	3.3	—	—	—	—
TOTAL[b]	100.0	100.0	100.0	100.0	100.0	100.0	100.0

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[a] Educational attainments for household heads and spouses are included for the currently affected communities. Data for the United States and for the states were reported for persons 25 and over. Because of the method of data analysis for the Household Survey, it was not possible to present data for persons 25 and over only. Some household heads and spouses were under 25, but only six listed their occupations as "student," and so the rest were assumed to have completed their educations. As a result of the procedure of including only heads and spouses in this analysis, some household members over 25 (48 persons) were left out of the educational attainment data for communities presented here.

[b] Totals may not add to 100.0 percent because of rounding.

[c] Source: U.S. Bureau of the Census, *1970 Census of Population: Characteristics of the Population, United States Summary* (Washington, D.C.: U.S. Government Printing Office, 1973), pp. 1-493, 1-494.

TABLE 5

MEDIAN ANNUAL HOUSEHOLD INCOME

Population Group	Median Income
Newcomer Construction Workers	$17,689
Other Newcomers	15,300
Long Time Residents	13,913
United States	10,512[a]

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[a] This is a 1973 figure, while the figures for the other groups are 1975 figures (the household survey was conducted in the summer of 1975). For purposes of rough comparison, if the U.S. figure is adjusted for 10 and 8 percent average inflation in 1974 and 1975 respectively, it would have a value of $12,488. The implicit price deflator for GNP was 10.28 percent higher in 1974 than 1973, and for the first three quarters of 1975, was 8.05 percent higher than the average for 1974. Source: U.S. Bureau of the Census, *Consumer Income: Household Money Income and Selected Social and Economic Characteristics of Households* (Washington, D.C.: U.S. Government Printing Office, 1973), p. 1. U.S. Bureau of Economic Analysis, *Survey of Current Business* (October, 1973), p. 13.

regularity in the currently affected communities that it might be hypothesized that construction worker spouses are not encouraged to have jobs outside the home. This could be the case for a number of reasons, e.g., construction worker incomes were so high that secondary incomes were unnecessary, or labor force participation by spouses might inhibit the transient life style developed by many members of this group.

Demand for Housing

Provision of adequate housing has probably been the most difficult problem for the communities that have been, or are presently being, affected by large construction projects. Information about housing preferences and demand was derived from a series of questions designed to distinguish between what type of unit respondents indicated they would like to live in relative to the type of unit they would be willing and able to purchase if it were available. The first category is referred to as housing preference, while the second is referred to as housing demand. Table 6 shows that newcomer construction workers, other newcomers, and long time residents are distinctly different with respect to the type of unit in which they live, their preferences, and what they would buy if it were available.

The percentage of each of the three types of respondents living in single family homes ranged from only 19 percent for newcomer construction workers to 76 percent for long time residents. Of other newcomers interviewed in the survey, 44 percent were living in single family homes. If single family homes had been available in the local housing market, however, 34 percent of the newcomer construction workers, 55 percent of the other newcomers, and 81 percent of the long time residents indicated that they would have lived in a single family unit (these figures include those who were already living in single family housing who were satisfied with their dwellings). The group showing greatest unsatisfied demand for single family housing (Demanded minus Actual in Table 6) was the newcomer construction workers (15 percent of the households), followed by other newcomers (11 percent), and long time residents (5 percent).

TABLE 6

HOUSING TYPE, PREFERENCES AND DEMAND FOR THE FIVE CURRENTLY AFFECTED COMMUNITIES

	Number of Workers			Percentage		
Type of Unit	Actual[a]	Preferred[a]	Demanded[a]	Actual	Preferred	Demanded
			NEWCOMER CONSTRUCTION WORKERS			
Single Family	76	181	136	19	46	34
Duplex, Townhouse	7	5	6	2	1	2
Apartment	40	30	36	10	8	9
Mobile Home	212	151	181	53	38	46
Other	62	30	39	16	8	10
	397	397	397	100	101	101
			OTHER NEWCOMERS			
Single Family	133	212	167	44	70	55
Duplex, Townhouse	15	11	13	5	4	4
Apartment	49	21	39	16	7	13
Mobile Home	97	51	77	32	17	25
Other	10	4	7	3	1	2
	304	304	304	100	99	99
			LONG TIME RESIDENTS			
Single Family	267	306	284	76	87	81
Duplex, Townhouse	4	2	4	1	1	1
Apartment	15	10	14	4	3	4
Mobile Home	62	31	47	18	9	13
Other	3	3	3	1	1	1
	351	351	351	100	101	100

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[a] Actual indicates respondent's present housing type, preferred is respondent's indicated preference, and demanded is type respondent indicates would be purchased except that it is unavailable.

The data for mobile homes reflect the same basic relationships as do the data for single family homes. Fifty-three percent of newcomer construction workers lived in mobile homes while the figures for other newcomers and long time residents are 32 percent and 18 percent, respectively. When the newcomer construction workers were asked to indicate their preferred type of housing, only 38 percent indicated mobile homes. This percentage rose to 46 percent, however, when those respondents who were either unwilling to buy, or unable to afford, their preferred type were added back into the mobile home demand category. They were considered not to be demanding their preferred type, since they would in fact live in mobile homes even if other housing were available. It appears, therefore, that only about seven percent of the newcomer construction workers (53 percent minus 46 percent) could and would actually give up their mobile homes if their preferred housing type were available. The percentages for other newcomers and long time residents are seven and five percent, respectively. With respect to other housing types, there were only small differences between the actual, the preferred, and the demanded types of units. The conclusions that can be based on Table 6 include the fact that there are and that there was a small group of households (6.4 percent of all households) living in mobile homes in the currently affected communities only because other types of housing were not available. Nevertheless, a large part of the dissatisfaction with housing seems to stem from cost rather than availability considerations. Something can be done about availability, but the cost of housing in these communities, as elsewhere in the United States, is not likely to decrease.

Effects of Construction Projects and Associated Population Growth on Long Time Residents

Income

It was noted in the previous section that median household income of long time residents was the lowest of the three subpopulations in the currently affected communities ($13,913 annually). However, if the median annual household incomes for the post-impact and pre-impact communities are examined, it is apparent that the long time residents in the currently affected communities have relatively high incomes. Table 7 compares incomes for the residents of the post- and pre-impact communities and the long time residents of the currently affected communities. Long time resident median income in the currently affected communities is 19.5 percent higher than that of the post-impact communities and 16.7 percent higher than that of the more prosperous pre-impact communities.

Equally interesting is the effect of the construction booms on the rate of increase of median income in the currently affected communities over the period 1970-1975. Table 8 shows 1970 income data for the currently affected Wyoming communities of Rock Springs and Green River (published community income data were not available for the other three currently affected communities), and it is clear that the 1975 level of household income in these communities is due to the economic activity that has occurred in the period from 1970 to 1975 rather than to unusually high 1970 levels. There is no directly comparable 1975 United States median household income estimate, but in 1973, the value for the United States had risen only to $10,512; allowing 10 and 8 percent inflation for 1974 and 1975, the national median income would be $12,488, a figure substantially lower than the medians for long time residents in Rock Springs and Green River.

Job Switching by Long Time Residents

Twenty-two percent of all long time residents interviewed worked in the construction industry. Of these workers, 45.6 percent had worked in other industries previously, and it is likely that a high proportion of this job switching was due to the sudden availability of high-paying construction jobs. Job switching also helps explain the relatively high income for long time residents in currently affected communities.

Residents' Plans for Staying in the Community

There was not much variation with respect to plans for staying in their communities among long time residents of the currently affected communities, residents of the post-impact communities, and

TABLE 7

MEDIAN HOUSEHOLD INCOME — ORIGINAL RESIDENTS OF CURRENTLY AFFECTED, POST-IMPACT, AND PRE-IMPACT COMMUNITIES

Group	**Median Income**
Long time residents — currently affected communities	$13,913
Post-impact communities	11,636
Pre-impact communities: Killdeer, N.D.	7,900
St. George, Utah	11,923

TABLE 8

MEDIAN HOUSEHOLD INCOME, 1970 AND 1975

Group	**Household Survey 1975**	**U.S. Census[a] 1970**
Long time residents		
Rock Springs	$15,396	$8,066
Green River	16,364	9,264
Wyoming		7,433
United States		8,486

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[a] Data are medians for families and unrelated individuals. These census data were most nearly comparable to the household income definition used in the Household Survey. Source: U.S. Bureau of the Census, *1970 Census of Population: General Social and Economic Characteristics, Wyoming* (Washington, D.C.: U.S. Government Printing Office, 1973), pp. 52-100-144.

residents of the pre-impact communities. This finding suggests that long time community residents are not so negatively affected by the presence of large construction projects and the accompanying population growth that they break their community ties and leave as a result of the growth. There is evidence that some long time residents were unhappy about the changes brought to their communities as a result of construction projects (discussed in the section on long time residents' attitudes toward construction projects below), but the great majority was not so unhappy as to leave the community. Table 9 shows the distribution of answers to the Household Survey question about plans for staying in the area by long time residents of the currently affected communities and by residents of the pre- and post-impact communities.

TABLE 9

PLANS FOR STAYING IN THE AREA

	Percentage of Residents			
			Pre-Impact Communities	
Plans	Long Time Residents, Currently Affected Communities	Post-Impact Communities[a]	Killdeer	St. George
Settle down here	75.9	63.7	77.6	67.0
Leave immediately	1.1	10.1	—	2.2
Stay as long as work is available	10.2	17.3	16.4	20.9
Uncertain	4.2	5.6	4.5	5.5
Leave at retirement	4.0	2.8	1.5	4.4
Stay until transferred	2.8	.6	—	—
Other	1.7	—	—	—
TOTAL	100.0	100.0	100.0	100.0

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[a] A rather high proportion of residents saying they will leave immediately is shown for the post-impact communities. Newer residents (five years or less) of Langdon, North Dakota account for almost all of this group. At the time of the survey, some additional construction of the ABM site was being completed, and it is assumed that the people working on the site were those who were planning to leave, since most of them listed "armed services" as their occupations.

Satisfaction with Community Services

One of the most immediate and visible effects which rapid population growth has on a community is that of greatly increased demands on community facilities and services. Unless a town has excess capacity in its facilities prior to growth, severe inadequacies can occur. In the Household Survey, respondents were asked about their satisfaction with community services, including law enforcement, fire protection, utilities, garbage collection, streets and roads, medical facilities, entertainment and shopping opportunities, schools, and housing. Long time residents of currently affected communities showed less satisfaction and more dissatisfaction than did the residents of pre- or post-impact communities for all services except fire protection. The currently affected communities had the least adequate community facilities in fact and long time resident responses were a reasonably accurate reflection of their adequacy. Since the responses can only be analyzed in light of the adequacy of facilities in specific communities, service specific summaries of responses are in the COMMUNITY REPORTS and community facilities data are in the appendices to these reports. It is interesting to note, however, that newcomers in the currently affected communities generally were less satisfied with community services than were the long time residents, with other newcomers usually less satisfied than newcomer construction workers.

Attitudes of Long Time Residents About Effects of Construction Projects

Long time residents in the currently affected communities were asked how they felt about the effects that the construction projects in the area were having on the community and its residents. When asked whether the effects of the construction were the same, better, or worse than they had originally expected, only 14.5 percent of the respondents answered "better," 32.8 percent said the effects were worse than expected, and 52.4 percent felt the effects were about what they had anticipated. There was a tendency for those who had lived in the currently affected communities for fifteen years or longer to answer "worse" more frequently than other respondents; nearly 40 percent of these respondents thought the effects were worse, whereas only 22.8 percent of the others thought so.

The reasons given most frequently for thinking the effects were better than expected were "improved community facilities" (40 percent of those thinking the effects were better) and "financial benefits" (35 percent). The reasons given most frequently for thinking the effects were worse than expected were "inadequate community facilities" (63 percent of those thinking the effects were worse) and "increased population" (22 percent).

When asked whether they were glad or unhappy that the projects were in the area at all, most respondents (67 percent) said they were glad; however, respondents who had lived in the area fifteen years or more were more frequently unhappy about the projects than those who had lived there for less time. Forty percent of those living for fifteen years or more in the area were unhappy, whereas only 21.6 percent of the others were. There was also a tendency for those with higher incomes to be glad more frequently than those with lower incomes. Seventy-one percent of those with annual household incomes of $15,000 or more were glad of the presence of the projects, and 64.7 percent of those with lower incomes were glad. The reasons given most frequently for being glad the projects came to the area were "job opportunities" (37.6 percent of the respondents who were glad) and "financial benefits" (26.5 percent).

Nearly 32 percent of all respondents were unhappy that the projects had come to the area. The reasons given most frequently for this were "caused town problems" (28 percent), "increased population" (27 percent), "inadequate community facilities" (27 percent), and "arrival of undesirable people" (26 percent).[4]

Attitudes of Newcomers About Living in the Currently Affected Communities

Having looked at some of the effects that growth has had on the original residents of the currently affected communities, it was felt that it would be useful to see how the newcomers to those communities perceived the town to which they had moved. A slight majority of newcomers appeared to feel negative about the communities, and their jobs were the things newcomers mentioned most frequently as being what they liked most about living in the area.

Most newcomers to the currently affected communities came there for work-associated reasons, i.e., job opportunities, job transfer, etc.; over 86 percent of the newcomers originally moved to these communities for those reasons. All newcomers, most of whom did not move to the area because they wanted to live there, were given a list of 18 descriptive words and asked to select the two or three words which they felt best described the community. Some of the words were descriptive in a positive way, while others were negative.

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[4] Respondents were encouraged to give more than one response about why they were glad or unhappy about the projects, so percentages may add to more than 100.

Negative words (lonely, dull, unfriendly, isolated, difficult, expensive, dirty) were chosen 52.9 percent of the time. Positive words (easy, happy, modern, exciting, rewarding, friendly, and relaxed) were chosen 32.9 percent of the time, and neutral words (competitive, impersonal, conservative and slow moving) were chosen 14.2 percent of the time.[5] Obviously, there can be some argument about the classification of these words. For instance, ''isolated'' could be considered quite positive by some people, and ''impersonal'' might be considered negative rather than neutral. An attempt was made to attach the value that most respondents would give to these words.

The most frequently mentioned descriptive words were ''expensive'' (16.2 percent of all responses), ''friendly'' (14.2 percent of all responses), and ''dirty'' (10.8 percent of all responses).

Respondents were also asked to name the things they liked most about living in their communities. The categories of answers which were mentioned most frequently were job-related factors (22 percent of all responses), friendly people (18.5 percent), recreation opportunities (13.2 percent), and rural atmosphere (11 percent).

When asked what they liked least about living in the currently affected communities, respondents most frequently gave answers concerning the environment and physical surroundings (29.2 percent of all responses), inadequate community facilities (26.4 percent), and lack of recreation and entertainment facilities (12.8 percent).

The newcomers see some disadvantages associated with their new situations but these are apparently outweighed by the economic and employment-related opportunities offered by the construction projects.

APPLICABILITY OF THE RESULTS TO THE PLANNING AND IMPACT ASSESSMENT PROCESSES

Most of the effort that went into the CONSTRUCTION WORKER PROFILE STUDY was devoted to the collection and processing of large quantities of data. From the very beginning, however, focus was kept on the ultimate objective of increasing understanding of the ways in which construction projects affect those communities close to them. In particular, it was necessary to know more about the size of the population influx expected to directly accompany a construction project. Pursuit of this information required two steps. First, observations were needed on several projects so that the extent of the variations in population influx could be observed. The second step was to determine whether project to project variability could be explained. The object, therefore, of the last part of the study was to systematically investigate some of the relationships with which the surveys dealt in order to statistically analyze the inferences that could be drawn from the data.

Four of the relationships investigated related to the size and demographic composition of the population increase directly associated with a construction project. The actual population increase experienced by a community depends upon: the extent to which non-local workers are employed on the projects, the number of non-local workers who choose to live in the community in question, the number of workers who are accompanied by their families, and, finally, the average size of the families accompanying the construction workers. The data from the Project and Household Surveys applicable to these relationships were reviewed, hypotheses developed and tested, relationships quantified, and some indication given of the applicability of the results to the planning and impact assessment processes. This analysis is described in detail in the FINAL REPORT but some of the more interesting findings are summarized below.

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[5] Respondents' first two choices were included for analysis. So there was a total of 1366 answers to this question, with 689 persons responding.

Source of Supply Model

The source of supply model represents an attempt to predict the number of local construction workers who will work on a given project. It must be determined whether project to project variation in the number of local workers can be explained by characteristics of the projects and of the communities near them. Five simple hypotheses were developed about the way in which the supply of local workers might be determined.

- The number of local workers supplied by a community to a project will be positively related to the size of the community.

- The number of local workers supplied by a community to a project will be a positive function of the total number of employees on the project.

- The number of local workers supplied by a community will be inversely related to its distance from the project.

- To the extent that workers from a community are already employed on other projects within the region, the supply of local workers to a new project will be diminished.

- The larger other communities within the commuting region of a project, the smaller will be the supply of local workers from any given community.

The fourth hypothesis takes account of the fact that the supply of construction workers within a community is limited, and therefore the supply of local workers available to one project will be diminished by the existence of other projects. The last hypothesis reflects the possibility that the number of jobs available to the residents of a given community may be limited if there are large competing sources of supply from other communities within the commuting region.

The empirical results showed that all of the hypothesized determinants had statistically significant impacts except for the last one, and that the combined effect of the variables explained a large proportion of the variation in the local/non-local composition of the construction forces at the fourteen projects surveyed.

Community Choice Model

Once an estimate has been made of the number of local workers expected on a project and from that the required number of non-local workers, the next problem is to estimate where they will choose to live within the commuting region. Will their residential choices reflect preferences with respect to community size, and does distance from the project site affect choice of community? If so, how, and are there other variables that seem to influence community choices?

The community choice model is based on the idea that the relative attractiveness of communities can be measured by observing the relative numbers of non-locals from a given project who have settled in each. The basic hypothesis of the model is that the relative attractiveness of a community as a place of residence for workers from a given project depends on the size of the community and on the distance separating the community and the project.

Statistical testing of the model indicated that the community choice model can explain much of the variation in the choice of place of residence and that, with the exception of the southwest Wyoming area, the hypotheses underlying the community choice model were supported by the data obtained in the Project Survey. The quantitative magnitude of the parameters varied substantially from area to area, however, indicating that region specific characteristics have to be taken into account before much progress can be made in predicting the communities where non-local construction workers will choose to settle.

Characteristics of the Dependent Population

Once the number of non-local workers expected to move into a community has been estimated, the next step is to project the number of dependents that can be expected to accompany them. The number of dependents will result from the interaction of the following factors:

(1) the proportion of the non-local workers who are married;
(2) the proportion of the married non-local workers who bring their families with them; and
(3) the average family size of the workers whose families accompany them.

Table 2 showed that for the 14 projects surveyed, an average of 227.8 persons in-migrated for every 100 non-local workers.

The demands made on the public and private facilities of a community depend, however, not only on the number of new residents but on their characteristics. Most important is the age distribution of the children because of its implications for education planning. The strategy behind the approach taken in this study was to try to maximize the response to the Project Survey questionnaire by keeping it very brief. Characteristics would then be attributed to the non-local Project Survey workers on the basis of the substantially greater detail obtained in the Household Survey. The crucial questions became, therefore, the degree of correspondence between the two data sets and the extent to which the information from one could be used to supplement that from the other.

Newcomer construction workers in the Household Survey correspond to non-local construction workers in the Project Survey, and the comparability of the two sets of respondents was investigated by looking at family size characteristics. The subgroup of particular interest was the married workers with family present since they accounted for 77.6 percent of the population influx experienced by the communities (176.7 of 227.8 persons based on the average for all 14 projects). Table 10 shows that the average family size of married non-local workers with their families present identified in the Project Survey was almost identical to that of the married newcomer construction workers in the Household Survey. This provides justification for assigning attributes determined in the Household Survey to the similar subpopulation identified in the Project Survey. Using the age distribution of the children of newcomer construction workers with families present (Household Survey) to allocate the children of the non-local workers with families present (Project Survey), Table 11 is derived. The table shows that for each 100 non-local workers, a total of 78.9 children can be expected based on the average of the 14 projects and that 45.9 of these children will be of school age.

TABLE 10

FAMILY SIZE — MARRIED WORKERS, FAMILY PRESENT

	Family Size
Project Survey — 14 projects, non-local workers, N = 901	3.61
Household Survey — 5 currently affected communities, newcomer construction workers, N = 303	3.59

TABLE 11

POPULATION INFLUX FOR 100 NON-LOCAL CONSTRUCTION WORKERS WITH AGE DISTRIBUTION OF CHILDREN

		Number
Single, widowed, or divorced workers		24.6
Married workers, family absent		26.5
Married workers, family present		48.9
Spouses		48.9
Children (Total)		78.9
less than 5	28.2	
5-11	28.6	
12-14	8.9	
15-17	8.4	
18-19	2.8	
20-24	1.5	
25-29	.5	
TOTAL		227.8

CONCLUSION

It should be clear that what has been described above is indicative of the potential of the data base for further research and only scratches the surface of the body of questions that can fruitfully be investigated. No attempt, for example, has been made to examine the way in which individual characteristics affect individual behavior. There is also a whole set of considerations relating to occupational mobility and labor force participation that is very important for purposes of impact assessment but which has not yet been scrutinized. What has been discussed is, therefore, only a beginning of what is hoped will be extensive and productive use of the CONSTRUCTION WORKER PROFILE data base.